0005

March 10, 2003

TO: Internal File

THRU: Daron R. Haddock, Permit Supervisor

FROM: Gregg A. Galecki, Reclamation Hydrologist

RE: Response to Informal Conference – Updating of Chapter 7, Hiawatha Coal Company, Hiawatha Complex, C/007/011-AM02B-2, Carbon County, Utah, Internal File

SUMMARY:

The following review addresses changes made within Chapters 5, 6, and 7 of the approved Mine Reclamation Plan (MRP) for the Hiawatha Complex mine. The changes were in response to a Division Order issued May 1, 2002. The Division of Oil, Gas, and Mining (Division) received the original submittal on June 6, 2002, which was returned to the Hiawatha Coal Company (Operator) with deficiencies on August 8, 2002. On October 10, 2002, the Operator asked for an extension to November 30, 2002, to complete the work. The extension was granted and the amendment was received at the Division on December 3, 2002. The submittal was returned to the Operator on January 27, 2003, with additional deficiencies, which was re-submitted to the Division with responses on March 3, 2003. The following is a review of the information submitted on March 3, 2003.

The primary focus of this review is to evaluate the effects on groundwater associated with the Bear Canyon Fault as water is encountered during mining, which involved updates/modifications to the Engineering (Ch. 5), Geology (Ch.6), and Hydrology (Ch.7) sections of the MRP. Although engineering information was provided for additional insights related to subsidence, the subsidence information was not evaluated from an engineering perspective; that will be conducted under a different review when an 'official' mine plan is submitted.

It is important to mention that mining has taken place within the permit and surrounding area for almost 100 years. The Hiawatha Mine is currently inactive with all the portals being closed since 1993. All the modifications created by Hiawatha Coal Company for this submittal are based on U.S. Fuel Company's data that could be located. Additional modifications are needed prior to Division approval.

TECHNICAL ANAYLSIS:

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

Earlier references in the MRP indicating U.S. Fuel as being the Mine Operator have been corrected. A change order has been submitted to the Division of Water Rights to indicate that water rights previously controlled by U.S. Fuel have been transferred to the current owner. In all instances the MRP now reflects Hiawatha Coal Company as the current Mine Operator and uses U.S. Fuel only in the past tense. Also included in the current application is a copy of the Mayo 2001 report, which was requested. Both the amendment and Mayo 2001 report were submitted electronically. When viewing the amendment in that format, citing to the Mayo 2001 report are electronically linked to the exact page (reference) in the report. This has been very helpful when reviewing the amendment electronically.

The majority of the spelling, pagination, and text modifications cited during the last technical analysis were addressed adequately. When referring to water quality data, reference to the Division database was added on pages 7-30 and 7-103. However, the last paragraph of **Impacts to Springs**, located on 7-73, needs to be modified as requested (reference Database).

Also on page 7-73, a discussion of Spring SP-3 suggests the spring has been monitored since 1980 and indicates data is insufficient to determine long-term trends. Omit or correct the discussion to indicate that Spring SP-3 was sampled from 8/80 – 1/85 and is no longer sampled.

Other references to Section 724.600, a section that no longer exists in the MRP, were noted on pages 7-54 and 7-67. The sentences need to be re-written so as not to reference Section 724.600. It is recommended a 'word-search' be conducted to ensure no other references to 'Section 724.600' exist in the text.

Findings:

Information in the proposal is not adequate to address the requirements of the General Contents section of the regulations. Prior to approval modifications need to be made in accordance with:

R645-301-121.200, Ch. 7 PHC, last paragraph of Impacts to Springs, located on 7-73 needs to be updated to indicate the 'Division database provides current data'.

R645-301-121.200, Omit or correct the discussion (pg. 7-73) to indicate that Spring SP-3 was sampled from 8/80 – 1/85 and is no longer sampled.

R645-30-121.200, Modify or delete the reference to section 724.600 on pages 7-54 and 7-67 and all other references to Section 724.600 that exist in the text.

ENVIRONMENTAL RESOURCE INFORMATION

GEOLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

To fulfill the requirements of the May 1, 2002, Division Order, additional geologic information was requested to better understand the relationship between mining in the Hiawatha area and impacts to Big Bear Spring. Exhibits 6-4 through 6-12 have been added to the amendment to provide better illustrations of the geology of the permit area. Included in the Exhibits/illustrations are overburden and inter-burden maps, isopach maps of the coal seams, and structural contour maps of all three (3) coal seams to be mined. Included in Ch. 7 is Plate 7-23, which provides a north-south cross section extending from north of the Hiawatha permit boundary to Big Bear Spring in the south.

It is important to note that the mine portals have been sealed since 1993 and no new in-mine geologic data is available. Some of the drill hole information was lost prior to Hiawatha purchasing the mine. All cross-sections created by Hiawatha Coal Company are based on U.S. Fuel Company's drill hole information that could be located.

Findings:

Information in the proposal adequately addresses the minimum requirements of the Environmental Resource Information – Geologic Resource Information section of the regulations.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Ground-water Information

For a better understanding of the in-mine flows that are likely producing the discharge at the Mohrland portal, Plate 7-22 and additional text have been added to the amendment (Sec. R645-301-724, pg 7-14 – 7-16). The text provides comments from a mine engineer (Mr. Robert Eccli) who worked in the mine in the early 1970's. The comments outline three (3) primary sources of consistent inflow into the mine at that time, which are identified on Plate 7-22 (labeled A, B, C). Accurate flow records were never documented and the areas were subsequently abandoned. However, it is believed that once the pipeline servicing the town of Hiawatha from Area C was abandoned these sources were responsible for the flows at the Mohrland portal. The text provides additional narrative suggesting the Hiawatha mine is actually a dry mine relative to surrounding mines when comparing the ratio of discharge to the acreage of mine workings. This additional information adequately addresses the previously cited deficiency.

In Section R645-301-727, Alternative Water Source Information, text (second paragraph) indicates flow could possibly be depleted by approximately 28 gallons per minute based on information supplied Exhibits 7-2 and 7-7 (Seeps and Spring Map, and Overburden Map, respectively). Section R645-301-728, Effects of Mining on Streamflow, references table 7-9 (page 7-70) that compares stream monitoring sites and potential losses to baseflow due to subsidence. The text in the PHC draws a loose comparison using Exhibits 7-2 and 7-7. Modifications made to Exhibits 7-2 and 7-7 of this technical analysis solidifies this discussion.

Within Section R645-301-727 the Operator indicates that the combination of no mining occurring near the Big Bear fault since 1977, no drop in flows at the spring was noticed for 10 years after mining had ceased, and no mining below the Hiawatha seam is planned, that no alternative water supply should be required for the spring. However, the plan does identify several options for providing an alternative water supply. The plan indicates the development of an alternative water supply will be done in consultation with the Division. The plan also states, "the settlement of any disputes will be between Hiawatha Coal Company, the user of the affected water right, and the Division of Water Rights. The Division wants the Operator to understand any finding will be based on the 'quantity and quality of water cited in the existing water right.' Also, that the Operator will be responsible for water replacement, due to water loss caused by subsidence, for any mining conducted after October 24, 1992 (effective date of rule).

Section R645-301-728 (PHC Determination) makes numerous references to the King Mines and whether water was encountered in-mine. Modifications have been made to the text on pages 7-15, 7-16, and 7-63. However, additional references are made to various King Mines on

7-57 and 7-62 that need to be associated with a coal seam. This is important information if in-mine water is correlated to a specific coal seam. It appears that all the water encountered to date, has been encountered in the 'B seam', or stratigraphically highest seam to be mined. If the 'B seam' is the only seam where sustainable water has been encountered, it should be stated.

Baseline Cumulative Impact Area Information

In the second paragraph of Section 724.100, text indicates the region is hydrologically divided into three regions bounded by faults. This has been further defined to indicate the divisions are fault zoned and cliff outcrops, and the middle of the Eastern edge of the Wasatch Plateau.

Since at least 1983, the Mohrland portal has produced an average discharge of approximately 400 gpm. An age-dating survey conducted by Mayo and Associates in 2001 indicates the age of the water discharged at the Morhland portal to be 9,000 years old. Referencing the Mayo 2001 report, section R645-301-724.100 indicates 'groundwater flow is predominantly horizontal with very little vertical movement'. It goes on to say 'vertical movement of groundwater is limited to 100 to 200 feet'. In addition, the report indicates 'fracture-flow groundwater systems…are of limited lateral extent and do not convey large quantities of water over long distances'. Gentry Mountain is hydraulically isolated from other areas of the Wasatch Plateau and is supported in the Mayo report (Fig. 17 pg 99).

To better clarify the hydraulics in the Gentry Mountain area the Operator has provided additional Plates 7-22, 7-23, and an electronic version of the 'Mayo 2001' report. As discussed in the Groundwater Information section, Plate 7-22 illustrates the locations of in mine flows in relationship to previous mining. Plate 7-23 is a north-south cross-section beginning north of the Hiawatha permit area and extends south to Big Bear Spring. The Plate illustrates the stratigraphic location of the mineable coal in the Hiawatha area in comparison to the groundwater reporting at Big Bear Spring. Unfortunately, drill hole information within the Hiawatha permit area is restricted to the coal seams and the rest of the information is interpolated. Plate 7-23 illustrates the lowest coal seam to be mined (Hiawatha seam) is approximately 5 miles away from Big Bear Spring and likely separated from Panther Sandstone (aquifer supplying Big Bear Spring) by two (2) tongues of Mancos shale. When viewing the electronic version of the submittal, and the 'Mayo 2001' report is cited as a reference it is possible to 'click' on the reference and be automatically linked to the referenced page of the report. This additional information adequately addresses the previously cited deficiency.

Findings:

Information in the proposal is not adequate to meet the requirements of the Environmental Resource Information – Hydrologic Resource Information section of the regulations. Prior to final approval, the applicant must supply the following information in accordance with:

R645-301-728, references are made to various King Mines on 7-57 and 7-62 that need to be associated with a coal seam.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

General

Section 731.700 of the MRP provides a brief description of the major Exhibits provided in Chapter 7. The section has been updated to include Exhibits 7-5, 7-6, and 7-23 that adequately addresses an earlier cited deficiency.

Coal resource and Geologic Information Maps

The current plan provides cross-sections VI-2 (cross-sections A-A', B-B', C-C') that show a distinct break in slope/dip to the west. This break in slope begins west of drill holes DH 75-1 and DH 70-5, respectively. To assist in understanding the Operator was asked to provide a east-west cross section through the proposed future mined areas. The response indicated since no drill holes exist in the areas of proposed mining, only a general diagram could be provided (Figure 13b of the Mayo 2001 report). Figures 13a and 13b (pg. 62-63) from the Mayo 2001 are referenced both in the Geology – Cross-Sections, Maps and Plan, and Hydrology – Baseline Information sections of the MRP. These two figures adequately illustrate the potential restriction of groundwater (in an east-west direction) through similar geologic units due to faulting.

As requested in the 'Contour Maps' section of this technical analysis, Plates 6-4 through 6-12 have been provided to illustrate a much better understanding of the geologic and mining conditions. Contour maps of the Hiawatha and A seams help illustrate how water encountered in these units would naturally flow south, southwest if mine working were not encountered. Plate 6-4 – Hiawatha Overburden map, has been modified to illustrate both the past and projected Hiawatha working. Plate 6-7 – B seam Interburden Isopach map has been modified to include past and projected B seam workings information, and a contour interval.

When addressing 'Areas of Potential Subsidence', the text is somewhat misleading indicating only two areas will be subjected to multiple-seam mining. Although this is accurate for future mining, it neglects to mention that the majority of future mining is in areas that have been previously mined. The text does indicate conventional room-and-pillar mining methods are normally not subjected to surface subsidence. Both in the Geology chapter (pages 6-26 through 6-36) and Hydrology chapter (pages 7-78 through 7-80) the text provides a very definitive explanation mining methods and the potential subsidence caused by mining. Plate 7-2 – Mine Water Map provides a good illustration of all past mining, and Plate 5-2D provides an illustration

of all future mining. Due to the amount of past and projected mine-workings, to combine the two maps would not be legible. However, overlaying the two maps indicates a majority of future mining will be conducted in areas previously mined. In some cases, all three (3) seams will be mined. The current minimum economic mining thickness is five (5) feet and the maximum combined thickness of fully extracted coal may amount to as much as 25 feet. On page 6-36 text indicates 'maximum subsidence ranging from 20-feet down to 3-feet' is possible 'in areas where total thickness extracted is 25-feet.

In 'Areas of Potential Subsidence', Exhibit 7-7 – Maximum Extent of Potential Subsidence is referenced to illustrate the vertical projections of subsidence. This map was modified to account for subsidence based on future areas to be mined by providing both the vertical projection of fully extracted sections, and the maximum extent of surface subsidence (angle of draw). However, the Division is also concerned with identifying magnitude of the subsidence. Exhibit 7-7 needs to be modified to identify where potential subsidence could be 0 to 5-ft, 6 to 10-ft, 11 to 15-ft, and 16 to 20-ft. It should be noted that subsidence is being evaluated from a hydrologic prospective only. An additional review involving the engineering prospective will be conducted prior to mining being conducted (i.e. a pre-subsidence survey is necessary).

Mine Workings Maps

To satisfy a request to update the Mine Workings map, Plates 5-2a through 5-2d, and Plate 7-22 have been provided. Plates 5-2a through 5-2c illustrate the individual seams, their respective future areas to be mined, method of mining to be used, and anticipated year to be mined. Plate 5-2d illustrates potential future mining for all three (3) seams. Plate 7-22 illustrates at the old working and their relationship to major mine in-flows. Geologic maps 6-4, 6-7, and 6-10 have also been modified to illustrate overburden and inter-burden of the respective coal seams. For the current review all eight (8) maps were modified again so the B-seam (dark blue), A-seam (light blue), and Hiawatha seam (green) had the same color on all maps. This is very useful information when trying to remember where each seam is stratigraphically located. Also, areas being labeled as being caved/pillared areas are correctly identified in the respective legends. This adequately addresses previously cited deficiencies within this section.

Monitoring Sampling Location Maps

Plate 7-1 – General Surface and Subsurface Water Hydrology has been updated to reflect the current monitoring program. However, the UPDES monitoring sites (i.e.D004) appear to be on the map but are not in the legend. The UPDES sites need to be represented in the legend and identify their status (active/inactive). Also, the Mohrland portal is identified as a UPDES site, but it needs to be clearly identified as site 001 and being active. For specific information related to UPDES sites 003 through 009 and 011, the reader is directed to Exhibits 7-8, 7-9, 7-10, 7-11m, 7-12, 7-13, 7-14, and 7-15 respectively. With the exception of modifying the legend of revised Exhibit 7-1 (VII-1), earlier requests have been adequately addressed.

Subsurface Water Resource Maps

Plate 7-22 and text provided in the Groundwater Information section of the amendment adequately identifies the known inflows into the Mine. It is stated that once the mine is re-opened, additional monitoring and information will be acquired.

The aquifers located above the coal seams are absent from cross sections 7-5 and 7-6. Exhibit 7-2, in conjunction with Tables 7-1 and 7-2, strongly link the upper aquifers with geology. Modifications are still required to better illustrate connection between the springs and the geologic units when viewing the map. Within the legend, identify the six (6) geologic units (as outlined in Table 7-2) with a different color. Match the color of the numbering of the spring with the corresponding geologic unit, and put the flow in parentheses next to the spring.

Also, although Table 7-1 is referenced in Exhibit 7-2, the naming conversion is not discussed. It appears that the first number may correspond to the sampler; the second number possibly the month sampled; the third, the Section where the sample is located; and the fourth, the number of the spring, but this is not identified anywhere. The naming convention of the springs and seeps needs to be identified for Table 7-1.

Contour Maps

As briefly mention above in the 'Coal Resource and Geologic Map' section, Plates 6-4 through 6-12 have been provided to illustrate a much better understanding of the geologic and mining conditions. Isopach maps for the Hiawatha, A seam, and B seam are illustrated in Plates 6-11, 6-8, and 6-5, respectively. Structural maps for the same seams are illustrated in Plates 6-12, 6-9, and 6-6, respectively. Overburden for the Hiawatha seam, Interburden for the Hiawatha-A seam, and Interburden for the A-B seam are illustrated in Plates 6-4, 6-10, and 6-7, respectively. This adequately addressed earlier cited deficiencies, and provides valuable information in determining the hydrogeologic impacts.

Findings:

Information in the proposal is not adequate to meet the requirements of the Environmental Resource Information – Map, Plans, and Cross Sections of Resource Information section of the regulations. Prior to final approval, the applicant must supply the following information in accordance with:

R645-301-622, -722, In Exhibit 7-1 the legend needs the UPDES sites and their status (active/inactive) represented. Also, the Mohrland portal is identified as a UPDES site, but it needs to be clearly identified as site 001 and being active.

R645-301-623.300, -625, Exhibit 7-7 needs to be modified to identify where potential subsidence could be 0 to 5-ft, 6 to 10-ft, 11 to 15-ft, and 16 to 20-ft.

R645-301-622, -722, The naming convention of the springs and seeps needs to be identified for Table 7-1.

R645-301-622, -722, In Exhibit 7-2, modify the legend by identifying the six (6) geologic units with a different color. Match the color of the numbering of the spring with the corresponding geologic unit, and put the flow in parentheses next to the spring.

OPERATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Sampling and Analysis

The Division wants a better understanding of the source of the water being discharged at the Mohrland portal to help determine how much mixing (if any) of Bear Canyon fault water and other interstitial water is taking place. The 'Mayo 2001' report indicates a more comprehensive water quality analysis (than the required UPDES parameters) of the discharge from Mohrland portal was conducted from 1994 through 1997. A total of three (3) age-dating analysis was also conducted in 1996 and 1998. The Operator has submitted the age-dating analysis for the Mohrland portal, but did not submit the solute chemistry data for the same time period. The Division would like the existing solute water analysis (as recorded in Table A-1 of the Mayo 2001 report) be submitted electronically to the Division database. The Division also would like the solute sampling analysis to be collected on the same frequency as the other groundwater monitoring sites (Table 7-17). The Division understands the sampling currently being conducted fulfills the requirements of the UPDES discharge permit. The age-dating analysis conducted in 1996 and 1998 was conducted for C.W. Mining for a comparison to Big Bear Spring, however as stated in Section R645-301-724 the majority of water reporting to the Mohrland portal is generated within the workings on the Hiawatha mine. To fulfill the requirements of the Division Order, the Division feels this continued sampling is necessary to help confirm the water being discharged at the Mohrland portal remains consistent over time.

Ground-water monitoring

In Section R645-301-728 – Probable Hydrologic Consequences (PHC) Determination, Potential Water Bearing Zones, the Operator commits to monitor all in-mine flow encountered

that are greater than 5gpm and last for more than 30 days once the portal seals are breached and mining resumes. This commitment needs to be included in Section 731.200 – Groundwater Monitoring Plan in the same area where the Operator makes the commitment to 'consult the Division during the development of the plan'. This information needs to be repeated in the groundwater monitoring section of the MRP because the PHC is often not consulted when reviewing the water-monitoring program.

Section R645-731.200 – Groundwater Monitoring Plan of Chapter 7 has been modified to clearly identify baseline, operational, and mine-water discharge (UPDES) parameters to be sampled in Tables 7-15, 7-12, and 7-13, respectively. However, Table 7-17 – Water Monitoring Matrix needs to be referenced in the text immediately preceeding Table 7-12.

Surface Water Monitoring

Tables 7-14, 7-15 and 7-16 have been modified to include the recommendations cited in the previous technical analysis. However, two additional modifications are needed: 1) reference Table 7-17 in text (second sentence of Surface Water Monitoring Plan as the monitoring list and schedule; and 2) add stream monitoring site ST-1 to Table 7-17.

Water quality standards and effluent limitations

Section R645-301-750 of the amendment has been modified to accurately reflect the current frequency for sampling, reporting requirements and the recipients of the UPDES discharge information. This is available in Tables 7-17 and 7-13, respectively. This adequately addresses deficiencies cited in the earlier technical analysis.

Findings:

Information in the proposal is not adequate to meet the requirements of the Operation Plan – Hydrologic Information section of the regulations. Prior to final approval, the applicant must supply the following information in accordance with:

R645-301-731.210, Submit existing solute water analysis (as recorded in Table A-1 of the Mayo 2001 report) electronically to the Division database.

R645-301-731.210, Continue solute water quality analysis for the Mohrland portal as outlined in 'Mayo 2001' report and Table 7-17 of the MRP.

R645-301-731.210, In Section R645-301-200 – Groundwater Monitoring Plan, the Operator needs to reiterate the commitment to 'monitor all in-mine flow encountered that are greater than 5gpm and last for more than 30 days once the portal seals are breached and mining resumes'.

R645-301-731.210, Reference Table 7-17 in text in both the Groundwater Monitoring and Surface Water Monitoring sections of the MRP.

R645-301-731.210, Add stream monitoring site ST-1 to Table 7-17.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Prior to making modifications to the current Gentry Mountain Cumulative Hydrologic Impact Assessment (CHIA), the Division requests the information cited above. The Hiawatha Complex mine makes up a significant portion of the CHIA.

RECOMMENDATIONS:

Approval of the application by the Division is not recommended until the requisite deficiencies, cited above, are adequately addressed.

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